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THE STRATEGIC FACILITIES MANAGEMENT ORGANISATION IN HOUSING: IMPLICATIONS FOR SUSTAINABLE FACILITIES MANAGEMENT

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ABSTRACT

Two houses in the same street can be built in the same year, they can look the same, and still they might provide very different support for sustainable living. This article points to the Strategic Facilities Management Organisation (SFMO) as the most important concept, to understand and manage implementation of sustainable facilities management in housing administration. The concept provides a frame for understanding the roles and relations of tenants, owners, administrators and operators. The paper is based on a Danish research project on environmentally sound building operation including literature studies, workshops, questionnaire and case studies. The article offers an analysis of the strengths and weaknesses of 3 different constellations of SFMO, reflecting 3 different types of ownership: Social housing, owner occupied/private co-ops and private rented. It is a contribution to the expanding literature on sustainable facilities management, where it fills a gap as it deals with housing and strategic FM. Intended readers are those interested in housing administration and especially the transition of existing housing into more sustainable housing. Intended readers include building owners, policy makers, building administrators and FM-providers and others interested in process management and sustainability.

CLASSIFICATION: RESEARCH

List of abbreviations

BL: The National Social Housing Association in Denmark
FM: Facilities/Facility Management
SFM: Sustainable Facilities Management
SFMO: Strategic Facilities Management Organisation
TCO: Total Cost of Ownership

INTRODUCTION

The idea of developing processes and solutions for Sustainable Facilities Management (SFM) in housing seems obvious. The existing housing stock is already built; the majority without consideration of climate and environmental impact, and there is a need for a FM transformation to take place in order to align the housing sector with visions of a sustainable future. When building or rebuilding you can design for a sustainable building, and more and more investors do, but still there is the existing buildings which will also be our future buildings, until the attitude towards conservation/demolishing might change significantly. This is why operation and maintenance are so important in a strategy to reduce the environmental burden from housing as in other types of real estates.

SFM can be seen as a solution to *"unsustainable buildings and unsustainable building operation"*, but as pointed out in Elle et al. (2004), it takes a context oriented approach, to understand the context and the location specific potentials and barriers. Therefore, this paper addresses the organization of housing, the environmental practices and the motivations for realizing strategies of sustainable housing. The purpose of this paper is to explore the implications of the variations in ownership and the consequences of implementation of SFM. This is useful knowledge to politicians, FM-providers, tenants, building owners/administrators.

The paper explores the organization where decisions on a strategic level takes place, and how this organization is related to decision makers on tactical and operational level. For those working with housing it is well known that the operational level, the janitor at the location, often has a huge impact on the daily practice and whether sustainability issues are considered or not, in daily operation and maintenance. This means that the janitor and others at the operational level are important in a transformation process, where they can play different roles in sustainable facilities management. Varying from being a bottleneck in a transformation process, to being a change agent for developing new services, communication to tenants, improve the building etc.

Strategy is originally defined as the (long term) plans made and the actions taken in an effort to help the organization fulfill its intended purpose. In this paper we also include the concept of emergent strategy, which is a pattern that is consistency in behavior over time (Mintzberg 1994) to keep in mind that there might be differences between the strategy of those that are expected to take the strategic decisions, and those that in practice also has an influence on the strategic decisions. Therefore we understand the strategic facility management organization (SFMO) as an organization characterized as a loosely coupled organization or even better as a network of decision makers, with various roles and relations. In this paper, we focus on housing and the readers will find the answers to the following questions:

1. Who can be said to be in charge of strategic decision making in housing? What are the characteristics of this strategic facilities management organization?
2. How are different ownerships related to different constellations of the strategic facilities management organization (SFMO)?
    - Specifically: social housing, owner occupied/private co-ops and private renting.
    - What type of SFMO is demonstrating most experience in incorporating sustainability in housing administration?
3. What are the strengths and weaknesses in different SFMO for implementing sustainable facilities management?

In the following we present, firstly the background for our research with the theoretical frame for our empirical research, secondly our methodology, thirdly we present and discuss our findings and close with a conclusion on variations in SFMO according to different types of ownership and the implications for sustainable facilities management.

BACKGROUND

Sustainable management of existing buildings is one of the most important strategies in the transformation towards a sustainable society due to the huge quantum of square meters which is much larger that the square meters of new buildings, where sustainable design has been applied. Elmualim et al. (2009) argue in their article about the practice of SFM that "*facilities managers are in the forefront of delivering sustainable assets management and hence further the venture for mitigation and adaptation to climate change. But the overwhelming barrier for implementing sound sustainable FM is the lack of consensual understanding and focus of individuals and organizations about sustainability"*.

There is a growing interest in integrating sustainable measures in building operation; more and more facility managers and building owners are showing an interest in sustainable issues. It is increasingly acknowledged that facilities managers and 'building operators' are key actors in implementation of sustainable measures in

the building operation (Hodges 2006; Aune and Bye 2005). Facility managers need to develop a 'sustainable strategy' that can fit into the financial management of the organization, where new management tools such as Total Cost of Ownership (TCO) can be an important tool for promoting sustainable building operation (Hodges 2006). It has, however also been stressed that there is often a gap between the environmental benefits that users demand in building operation, and the services delivered by Facilities Management (FM). For example, customers have too little knowledge of the environmental services that FM operators are able to deliver, or facility managers have too little knowledge of user demands (Nousiainen and Junilla 2006; Madritsch 2006). Moreover, these services can be very diverse, as there are big differences among facility managers and administrators on the environmental themes that are considered essential (Malmqvist 2004).

Some of the barriers for implementing sustainable measures in the building operation are limited data on local consumption of energy, water etc., lack of incentives to create routines around environmental issues, limited knowledge about environmental themes in the housing organization, and that housing administrators have too little time and too few resources (Malmqvist 2004).

Other studies conclude that the organization of housing companies have great importance for their environmental performance (Brunklaus 2005). Brunklaus identifies a wide range of studies showing that there are several technical options for reducing environmental impact, but that an offensive attitude amongst owners and administrators is missing, and that limited resources within the organization and lack of long term maintenance are significant barriers to environmental performance (Elle et al. 2005). The results of a survey of consumption data over 10 years in two residential areas in Gothenburg suggest that a housing organization based on flexible planning and control is better able to absorb new energy and environmental requirements than an organization with more rigid procedures. Therefore the local organization and the housing management are crucial factors for the sustainable measures, possibly leading to a 25-30% difference in energy and water consumption (Brunklaus 2005).

In a Danish context the thesis on organizational structures influencing sustainable building operation is highly relevant, mainly in relation to different types of ownership. In relation to implementation of sustainable measures in new buildings, for many years the social housing sector has been leading, compared to other types of ownership (owner-occupancy, private co-ops and private renting). Although we expect that this will also apply for the building operation due to the generally well organised organizational structure of the social housing sector (Elle et al. 2005), we have so far not had any substantial picture of the differences between different types of ownerships on how and to which extent sustainable measures are being implemented in the building operation.

Through building operation and ordinary maintenance there is a number of smaller initiatives and investments that can improve the environmental performance of the building, for instance by using technologies as low energy windows, low flush toilets, low energy bulbs in shared spaces etc. Realising these potentials requires skills, knowledge and competences amongst the operation staff, as well as a determined building owner and dedicated tenants. Sustainable building operation therefore acknowledges that behaviour and use from the residents are as important factors as the purely technical qualities of the building.

In spite of high ambitions in Denmark of reducing energy use in buildings, the current regulation of existing buildings is limited. The goal formulated in the national energy plan, 'A visionary Danish energy policy', is to reduce the final energy consumption in households with 1.5% per year until the year 2020. This is approximately 3 times more than what has been achieved with up to date energy-saving efforts. The only mandatory regulation is that all buildings over 1.000 m2 should have an Energy Label at every sale or as minimum each 5th year. The Energy Label requires an energy review of the building, giving the owner a number of suggestions on how to make the building more energy efficient. However, the energy label scheme has, been widely criticised by building owners, residents, administrators and consultants for being too costly and causing too few changes in the owners' practice. A recent evaluation of the Danish energy saving initiatives rated the Energy Label of Buildings as the least cost-efficient initiative to reduce energy use in buildings (Ea Energianalyse et al, 2008).

For building renovation there is separate regulation. According to the national building regulations from 2008, a building renovation on large buildings should include energy measures if the renovation includes more than 25% of the building shell or if the costs exceed 25% of value of the building – but only if is proven profitable. From 2010 the regulation was expanded to include all building components in a renovation.

METHODOLOGY

This paper is based on the Danish research project "Sustainable Building Operation in Housing Estates" where researchers from the Technical University of Denmark and the Danish Building Research Institute explored the current practice of SFM through literature review, workshops, questionnaires and case studies. The aim of this research project was to identify how and to which extent sustainability issues are integrated in the operation of housing estates, with different types of ownership and in different organizational contexts (Jensen et al. 2008).

The project consisted of three different phases supplemented with a continuous literature study:

- First a workshop on sustainable housing operation was held with leading practitioners and researchers in this field to establish an initial understanding of current practice. A number of examples were presented of environmentally managed housing operation from practice and key issues in the area were discussed, including the potentials and barriers for further learning. The results from the workshop were used in the development of the questionnaires for the following survey.

- A questionnaire survey distributed to 196 public housing administrators and 161 private administrators via email. Overall, there was a response rate of 31% for the study as whole, broken down to 42% for the social housing administrators and 17% for private administrators. The social housing administrators in average managed 57 housing departments as customers, with almost 4,200 dwellings. The housing types includes multi-storey- buildings as well as row-houses and low-dense housing. The average private administrator managed 58 clients, with approximately 2,100 dwellings. These include different housing types, as well as different types of ownership (private renting, privately owned flats and private co-ops). The respondents amongst the private administrators are mainly real estate managers (74%) and lawyer companies (17%). The questionnaire included three groups of questions:

    1. The administrator and relations to the customers, including the environmental services that the administrator provided, as well the emphasis that managers themselves put on providing environmental services to the clients.
    2. The implementation of sustainable measures in the building operation. This included questions about specific environmental actions in the operation: a) Cleaning and care of shared outdoor and indoor spaces, b) Operation and maintenance of buildings, c) Operation of heating and water installations, and d) Information and capacity-building amongst residents and staff.
    3. Motivations and barriers for sustainable building operation, including questions on the most important motivation factors for sustainable building operation, and where the initiative to include sustainable measures typically comes from.

    The results from the survey were discussed and confirmed at a workshop organised by the environmental group of social housing administrations.

- Finally, five case studies of practical examples of sustainable housing operation were conducted, based on document studies and interviews with key persons. Cases were:

1. A relatively small social housing administration, the first to achieve "The Green diploma", which is a Danish certification to create visibility and attention to efforts implement environmentally sound building operation. Facts: 324 dwellings, build 1966-68.

2. A small private co-op where the chair of the owner association try to introduce environmental solutions. Facts: 48 dwellings and one shop, build 1954.

3. A large private housing administration company, who try to implement environmental consideration in their operation and administration. Facts: administrates about 50.000 units (separate administration agreement), in 1.100 estates, for about 400 costumers.

4. A large social housing association that has one of the most ambitious environmental politics and a long tradition for implementing environmental consideration in operation and in building projects. Facts: 22.000 dwellings, 78 units and about 24.000 dwellers.

5. A private energy consultancy company and their costumer, a private owned housing association. Facts: specialised in energy management, 35 employees. The costumer: 36 dwellings, build 1960.

The case selections were made to explore the social interactions in the management processes and to be able to display one of the most advanced examples of SFM within each type of ownership. Together the cases are representative for the main characteristics of the Danish building mass regarding age and architecture.

This article has the main focus on the organisation in relation to different types of ownership. Therefore, there will only be a few selected results presented from the questionnaire survey and the case studies will not be presented but used as a background for the analysis. More details about the empirical studies can be found in Jensen et al. (2008), Jensen (2008) and Nielsen (2009).

HOUSING AND FACILITIES MANAGEMENT

This section presents the findings in our research starting with the organization of FM in relation to ownership followed by analysis of what tools they use and their motivation for doing so.

FM in housing is different than in e.g. offices, production plants, and private businesses. For housing the core business are to provide housing for tenants, and could be housing of all kinds from the most low budget to very expensive, of different sizes, different locations and with access to different facilities. In this project we have researched housing in multi-storeyed buildings in general. From an environmental perspective the multi-storeyed housing is significant because of the many m^2 and from a building perspective also a rational basis for renewing and reconstruction.

The research project was initiated with a focus on (best) practices within the environmental building operation which is a sub-discipline of FM. However housing is relatively limited topic in existing FM literature and there is not yet an established principle for describing FM in housing. Table 1 gives an overview of similarities and differences between: social housing, owner occupancy/private co-ops and private renting.

	Social housing	**Owner occupancy and private co-ops**	**Private renting**
Administration	Housing organization	Private administrator, or self-administration	Private administrator; can be smaller or larger
Tenants influence on building operation	Residential based democracy. Residents selects local board and decides on local budgets	Residents select local board and decides on local budgets	Limited formal influence (for instance to veto decisions)

Organizational unit	Local department board	Local department	Local renters organization (optional) with very limited influence
Owner	Local housing department	Owner-occupied (residents) or by a co-op	Private landlord
Operation staff (Janitor, inspector, gardener etc.)	In-house and employed by the housing organization, limited service from the outside	Service from operators (contracts and ad-hoc), and from DIY work.	Smaller administrators have no operation staff (owner must arrange service-operators). Larger administrators have in-house staff

Table 1. Characteristics of stakeholder roles under different types of ownership

Type of ownership as well as sizes of the buildings are relevant for the nature of their administration and management. The different types of ownership give different influence to the residents, and different ways of making decisions. The many small buildings in private rental, private co-ops and owner occupied dwellings, mean that there are many "small" owners and administrators in this sector, whereas in social housing there are many relatively large housing organizations that take care of the building operation and FM for the different local boards.

Social housing: In social housing the residents are tenants who rent a dwelling in a social housing department, which is an independent organizational and economic unit. It is typically administered by a larger administrative social housing organization. The residents have the right to vote at the general assembly for the housing department, who takes all important decision, including economy, maintenance, election of the local board etc. This is the essence of the extensive 'residential democracy' in the sector. Social housing represents 36% of all dwellings in Danish multi storey buildings, and has a relatively high proportion of buildings between 1,000-5,000 m^2.

Owner occupied dwellings: These are dwellings in multi storey buildings individually owned by the residents. Here, the common decisions concerning the building are decided by an organization among the owners. The owner occupied dwellings represent 21% of all dwellings in Danish multi storey buildings. As for private rented and private co-ops, the owner occupied dwellings are dominated by many small buildings (100-1,000 m^2).

Private co-ops and private renting: For private co-ops, the residents buy a share of the co-op which entitles them to rent the dwelling and to vote at the general assembly, which takes all decisions about the co-op. Over recent years a large amount of private rented dwellings have been transformed to private co-ops, as the legislation has given the residents the possibility to buy the building when for sale. This has been very popular amongst the residents, who as co-op sharers gain more influence on their dwelling and building.
Private renting: In private rented dwellings the building operation is mainly decided by the owner, and residents/tenants have limited influence. Private renting and private co-ops each represents 14% of the dwellings in Danish multi-storeyed buildings. They are in Denmark dominated by many small buildings (100-1,000 m^2) with a limited number of dwellings.

Other: The other types of ownership in Denmark are private limited companies and public authorities. They represents a total of 12% of the multi storey dwellings, but have been left out of this research.

The organization of FM in housing has been analysed in accordance with the model in the European standard EN15221-1 (CEN/TC, 2006) in relation to the demand side and the supply side with FM mediating on strategic, tactical and operational level. Table 2 shows the parties involved in the organization according to these divisions for the different types of ownership of housing. Still the purpose is to understand the

stakeholders, and their roles and relations to identify the potentials and barriers for sustainable facilities management. Other research projects has analysed efficient models for housing administration (Blomé 2010), or as (Hui and Zheng 2010) customer satisfaction of FM services, while (Lai 2010) suggest a comparative evaluation method for facility services for housing estates. This is useful knowledge too, but the purpose of this research is to identify the FM stakeholders today, and who the stakeholders are on the demand side, who mediate demand/supply and who act on the supply side. Table 2 provides an overview of the FM organisation related to different types of ownership.

Ownership	Level	Demand side	FM mediation	Supply side
Social housing	Strategic	National or regional housing association		
	Tactical	Local tenants boards	Specialist staff	Consultants
	Operational	Tenants	Local inspectors	Mostly in-house staff centrally and locally
Owner occupancy and private co-ops	Strategic	Annual association assembly		
	Tactical	Association board	Association chair	Consultants
	Operational	Residents	Association chair	Private administrator and local providers
Private renting	Strategic	Director from owner organization	Director from private provider	Private provider and consultants
	Tactical	Manager from owner organization	Manager from private provider	Private provider and consultants
	Operational	Tenants	Inspector from private provider	Private provider and sub-providers

Table 2: The organization of FM related to ownership of housing

THE STRATEGIC FM ORGANISATION

FM is created in different organisational settings, as argued in the previous section. For the most advanced housing departments in practice, the various FM elements are administered by a number of different actors, with different roles and with different formal and practical possibilities for impacting FM and new FM practices. One of our conclusions in the research project (Jensen et al 2008) is that there is not just one FM operator; sustainable FM is practiced in a network. The role of the formal FM operator can therefore be characterised as 'network management', where social and communicative skills are as important as technical expertise.

The concept of SFMO is developed to name the unity of tenants, administrators, owners and operators, which all are some kind of decision maker in how to take care of housing, in practice. Figure 1 illustrates the strategic facility management organisation.

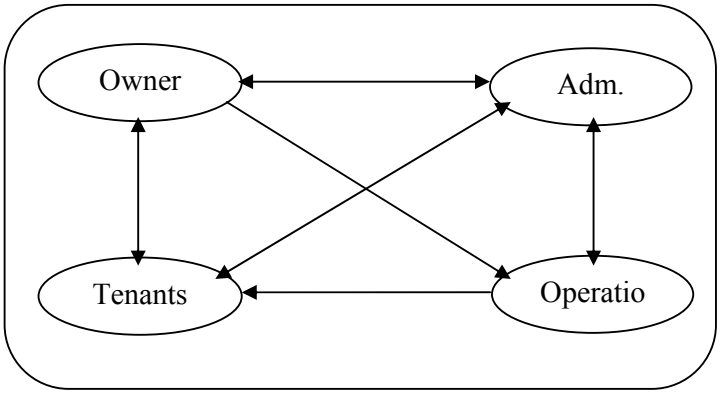

Figure 1: Organisational diagram of a strategic facilities management organisation

When analysing housing association based on the CEN model of Facilities Management (CEN/TC 348, 2006) one challenge is that FM is the core business, and not a support function. Or if regarded as a support function, then life and dwelling in itself becomes core business. Still the organisation has to manage its facilities and manage their demand and supply of facility services.

Table 2 shows that social housing associations are very self-contained organizations with most functions in-house. There is not indicated any FM-mediation and supply side on strategic level. That does not mean that such associations do not deal with strategies, but this takes place in the top management of the organization on the demand side. In general, in relation to FM social housing associations can be said to be purely demand driven. The specialist staff indicated at tactical level of FM mediation are technical specialists in the housing association, and they mediate with consultants and providers for instance in relation to energy management and major maintenance work, but they also function as internal consultants.

Social housing is the type of ownership which provides the most integrated frame for common decision making as shown in Figure 2. The owners are the local authority and the tenants and through representative democracy it is possible for a tenant to vote and to be elected as representatives for tenants in the social housing unit. The administration is done by the administration in the housing association and the operation managed also within the housing association using in-house of out-house services. The democratic rules prescribe the politics of roles and relations between owners, tenants, administration and operation.

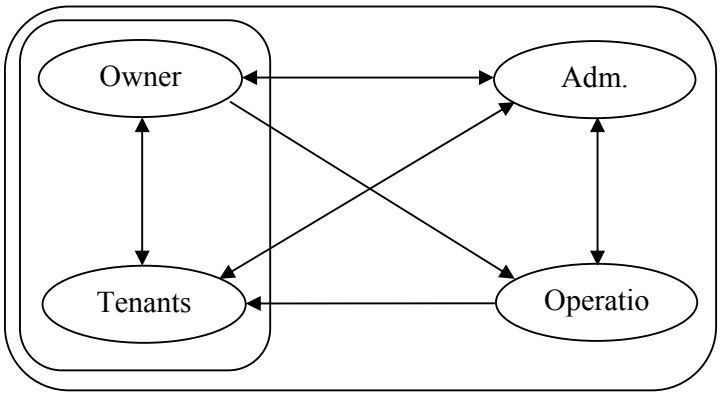

Figure 2: The strategic FM organisation in case of social housing.

The owner occupancy and private co-ops resemble social housing association by being very demand driven, but they are typically small and local organizations without many resources and very dependent on voluntary work by elected residents in their association board. Strategic decisions are solely made collectively at annual assembly meetings by all active residents. The association chair has a central role in FM mediation. The association usually has an ongoing collaboration with a private administrator who mostly takes care of rent administration and bookkeeping. These administrators are remunerated by a fee as a percentage of the total rent and are usually selected by reputation without any economical competition. The administration is often carried out by smaller lawyer firms or similar without any technical staff.

In owner occupied/private co-ops tenants are the only owners and each housing units have its rules for representative democracy. The administration is delivered by a professional housing administrator which sometimes is a law firm and the operation is delivered by external companies, after agreements with a board of owners, or directly by the tenants as shown in Figure 3.

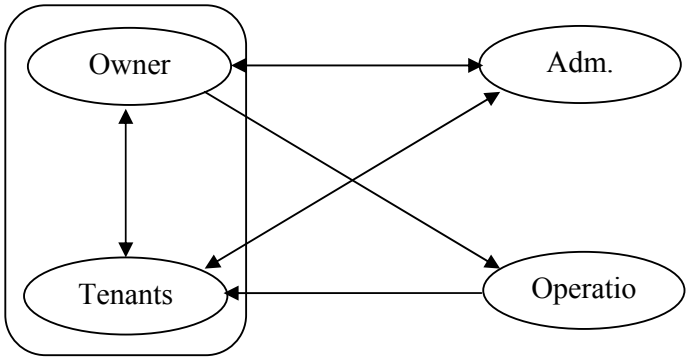

Figure 3: The strategic FM organisation in case of owner occupied/private co-ops

The private renting is mostly carried out by institutional investors like capital and pension funds. There is also some private owned rented out housing. For these the situation resembles very much the one for owner occupancy and private co-ops except that most things are managed by an owner representative and there is no association with an elected board and annual assembly. The situation indicated in table 2 is related to large organizations with a private provider responsible for all facility services. This represents a quite recent development related to the general development of the FM market. The provider can be an in-house organization but if so it is usually organised as a separate subsidiary company owned by the investor company and with the possibility to operate on the open market. There is an increasing trend towards economical competition between providers and towards extending the providers responsibilities for optimising the yield of the real estate investment. This increases the strategic focus on the development the property to increase the rent and to optimise the building operation and administration. The private renting in large organizations is in this way becoming more and more supply driven.

In case of private renting the owner owns the real estate and leaves most often administration, contact to tenants and operation to a professional building administrator as shown in Figure 4. The tenants can provide the administration with viewpoints about e.g. satisfaction levels, but have no formal obligations or rights to take part in FM decision making.

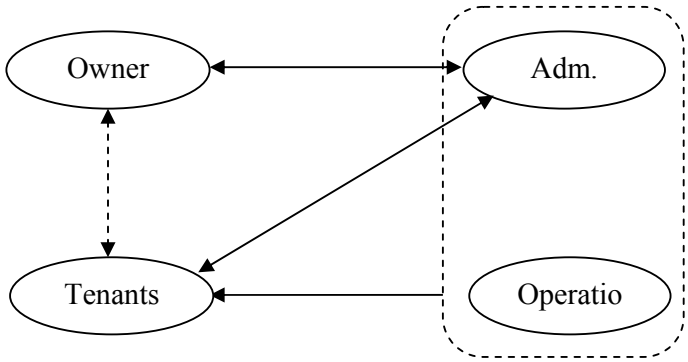

Figure 4: The strategic FM organisation in case of private renting

As illustrated above, different types of building ownerships leads to different roles and relations between tenants, owners, administration and operation. These are important parts for the context for FM as well as SFM in practice because the different stakeholders will have different roles and motivations of how they contribute to the daily use and operation of the estates as well as the FM-related decision processes.

IMPLICATIONS FOR SUSTAINABLE FACILITIES MANAGEMENT

In the following we will discuss monitoring as part of SFM, and outline different elements of monitoring. Monitoring is in different ways central for SFM and as an ongoing process of environmental management. This might include different aspects of monitoring as shown in Figure 5.

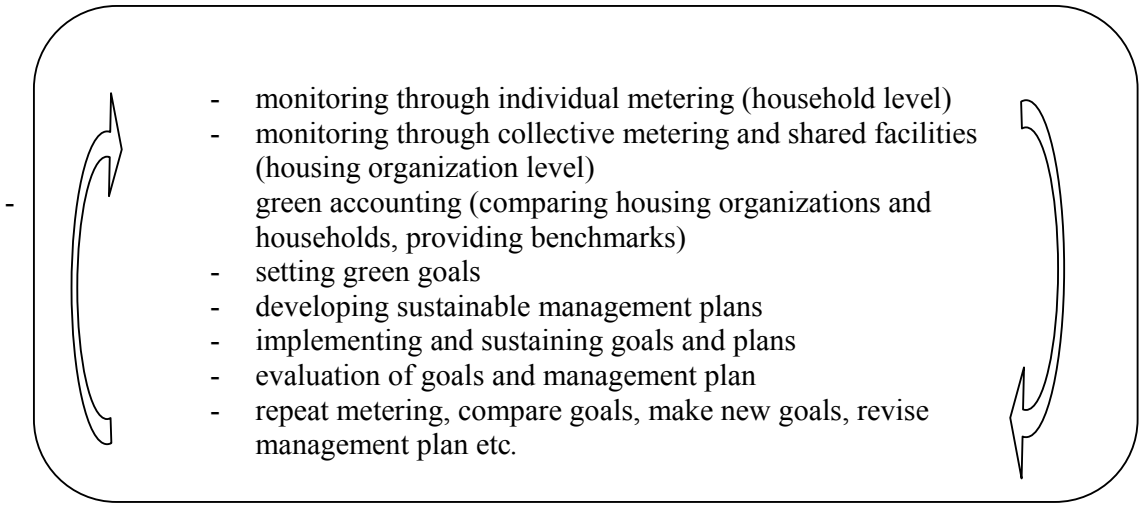

Figure 5: Monitoring of environmental performance

The role of the facilities manager is principally to manage this process, and to include the relevant actors, persuading them to join, asking them to define goals and suggest initiatives, delegating responsibility to them etc. Also information and knowledge support is necessary on all levels of the process. The housing organization and its actors must be updated with recent technological development, and the possibilities of

using these in order to optimise the environmental performance of the building, especially in relation to reducing flows of water and energy.

This involves many different actors, inside the organization (administration, operation staff, residents etc.) and outside the organization (FM managers, FM providers, consultants, infrastructure suppliers, green NGOs, local authorities etc.). The role of the facilities manager can therefore in principle include providing relevant FM services, the relevant information and managing different actors in the process of creating a sustainable agenda for the housing organization. However, how this looks in real life depends on the way the properties are managed, which varies with different types of ownership.

MOTIVATIONS AND CONDITIONS FOR SUSTAINABLE FACILITIES MANAGEMENT

The incentives and barriers to implement SFM are very dependent on the ownership. In social housing the situation depends on the overall policy of the association. Some associations has a very high profile in relation to sustainability and see it as a part of their mission to support overall societal objectives. It can also be part of creating a progressive image and be attractive to preferred groups of tenants. The social housing associations are in general fairly big national or regional organizations with a central office with highly qualified technical staff. The engagement in relation to SFM also depends on the attitudes and competences of the technical staff and some associations have technical staffs that are very enthusiastic about implementing SFM. The attitude among the tenants is also very important with examples of tenants acting as a barrier to implementation of SFM, particularly with consequent, increased rent.

Table 3 shows the difference in environmental attitude among private administrators and social housing administrators and table 4 shows the difference in environmental practice. The difference is very clear. Most of the social housing administrators see it as part of their mission to offer and deliver environmental services, while most of the private administrators see this as relevant for their mission.

On a national level, the National Social Housing Association (BL) provides various tools and offers to promote environmental measures in the local associations and departments. For instance, BL has developed a scheme called 'green homes'. Moreover, BL provides environmental training and education for the operation staff in the social housing organizations.

The situation in owner occupancy and private co-ops resembles the social housing association both depending extensively on the tenants' attitudes. These organizations usually being small and local do not have any technical staff and are dependent on voluntary work and residents' competencies or on consultants. However, due to limited budgets such associations are often reluctant to engage consultants unless there is a clear business case demonstrating cost savings.

In private renting there is a large barrier with the lack of incentives, because investments in improvements mostly have to be covered by the owners, while savings on energy costs mostly benefits the tenants. Due to legislation in most cases the owners cannot increase the rent. At the moment there is no indication that investors see it as a necessary tool to use SFM as part of the image of their property to attract tenants. However, larger providers have the technical competencies, and they experience that environmental considerations over time are becoming a normal part of professional FM.

Environmental attitude	Social housing administrators (% totally or partly agree)	Private administrators (% totally or partly agree)
It is important for us to achieve and offer environmental competences	71%	33%
We try to make our clients interested in environmental measures for the building operation	89%	45%
We don't think our clients are interested	52%	45%
We don't think environmental services are relevant for our mission	17%	55%

Table 3: Own environmental attitude according to private and social housing administrators

Environmental practices	Social housing administrators (% totally or partly agree)	Private administrators (% answers: 'used in 75-100% of properties')
Monitoring of heat central / boiler room	77%	32%
CTR-steering of heat central	21%	5%
Monitoring consumption of heat, water and electricity	72%	26%

Table 4: Types of monitoring done by private and social housing administrators

In table 5 we summarise our main observations from our survey and case studies amongst sustainable housing operation.

Type of ownership	Strengths	Weaknesses
Social housing	- Strong in-house organization and competences - Strong commitment to sustainable issues amongst administrators - Many large units	- Often tenants feels little ownership to the housing department - Often residents have short time-horizon, and no incentives for long-term investments
Private owned and co-ops	- Strong ownership and responsibility amongst residents - No owner-renter conflicts, stronger economic motivation for saving energy and water	- Limited in-house knowledge - Strong focus on reducing operation costs => cutting external FM services - Many small housing estates (<500 m2) - Administrator not committed to promote sustainable FM
Private renting (institutional owners)	- Often large knowledge and competences in FM-organization - Limited influence from residents	- Owner has strong focus on economic performance - Tenants feels little ownership - Potential owner-renter conflicts - Residents have short time-horizon, no incentives for long-term investments

		- Administrator not committed to promote sustainable FM

Table 5. Strengths and weaknesses for sustainable housing operation amongst different types of ownership

CONCLUSIONS

The paper presents the results of a Danish research project on housing operation and administration. The theoretical contribution is the concept, strategic FM organisation. The SFMO is a defined as a network of owners, tenants, administrators and operators. This paper presents three constellations of SFMO, referring to Social housing, Owner occupancy/Private co-ops, and Private renting.

The research shows that the SFMO vary according to ownership and this variation is important for the preconditions for those who want to promote SFM. The survey on environmentally sound building operation documents that there is a considerable difference the environmental attitude and environmental practices among social housing administrators and private administrators.

Social housing is strongly demand driven with and integration of demand and supply side in the same overall organisation with a high degree of professionalism of the mostly in-house FM provision. Owner occupancy and private co-ops is also demand driven, but the supply is not integrated and often fragmented with division of administration and operation. Private renting is becoming increasingly supply driven by large private FM providers and the demand side is strictly divided between owners and tenants.

Our results show that there are many good examples of sustainable building operation in Danish housing estates, where local building managers, residents etc. have gained impressive results. In the broader sense, however, there is a limited use of available methods and technologies. Barriers for the use of sustainable building operation have been identified, and related to different types of ownership; social housing, private rented, owner occupied and private co-ops. The survey indicates that the social housing sector has better conditions for implementing sustainability goals in their building management compared to other types of ownership, and that a considerable expertise has been generated in this sector. Our survey raises questions on how to broaden this knowledge to other actors in the sector, and to overcome barriers for sustainable building operation.

In private renting there is a large barrier with the lack of incentives, because investments in improvements mostly have to be covered by the owners, while savings on energy costs mostly benefits the tenants. However, larger providers have the technical competencies, and they experience that environmental considerations over time are becoming a normal part of professional FM.

We have studied housing and the potentials/barriers for realising sustainable facilities management. But our results regarding private owned and private rented housing, can to our knowledge be transferred to buildings used for business purposes, since the issues of ownership/user, are the same. This is confirmed by the private building administrator that administrate both housing and business buildings

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